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Campus R&D Still Waiting For that Industrial Gusher

Hopes and concerns have been raised by reports of a rush of industrial money into university laboratories. A handful of labs are indeed receiving new and substantial support from industrial firms. But the latest figures from the National Science Foundation once again indicate that the industrial bonanza, though regularly reported on the way, has still failed to arrive for all but a few.

Growth Rate in Non-Federal Academic R&D Support Exceeds That in Federal Support Over Last Decade (NSF 89-309, 6 pp., no charge; order from: NSF, Division of Science Resources Studies, 1800 G St. NW, Washington, DC 20550; tel. 202/634-4634).

The NSF data show that, overall, industry remains a very junior partner in the financing of research and development in academe, accounting for only \$777 million, or 6 percent, of the \$12 billion that universities spent on R&D in 1987. (NSF says all numbers are in 1982 dollars.) The alluring element in industrial support is that it's said to be growing at a rapid pace—a real 12 percent per year during 1977-87.

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while federal support maintained only a 4-percent growth rate. But, given the increasingly wobbly condition of American high-tech firms, which predominate among the donors, the maintenance of that torrid pace looks doubtful. Foreign firms, particularly West German and Japanese, are fishing for benefits from financial ties with American university science, but the NSF report doesn't sort the numbers by national origin. If the foreign share gets too high, however, the likely outcome is a Congressional backlash, foreshadowed by Rep. Ted Weiss's grilling of MIT's President last spring about MIT's rich relations with foreign firms.

Presented in characteristically bland language, the NSF report indicates that science in academe experienced pretty good financial growth over the 1977-87 period—an intriguing point, given the drumfire of complaints about "cuts" in federal support of university research. (A popular thesis on the science-fraud conference circuit is that "cuts" in federal grants have driven the ethically impaired to commit intellectual larceny as a means of staying professionally afloat.)

According to NSF, which is the official scorekeeper in these matters, university expenditures for R&D increased a real 7 percent between 1986-7. "In constant dollars," the report continued, "R&D spending in 1987 at universities

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New Kind of Science Journal Finds Favor with Advertisers

A shrewdly conceived and smartly executed new entry in science publishing, *The Journal of NIH Research*, is attracting a substantial volume of advertising revenue in a crowded, competitive field that's seen little growth in recent years.

It's too early to identify its economic effects. But SGR hears that the managers of the financially stagnant American Association for the Advancement of Science (AAAS) are uneasy about the privately published newcomer's impact on *Science* magazine, the bread-and-butter property of the AAAS.

The editor of the new publication is Deborah M. Barnes, a PhD neurobiologist who formerly was a staff writer for *Science*, and the publisher is William M. Miller III, former business manager of the AAAS. One of the principal financial backers is Martin Peretz, owner of the *New Republic*,

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In Brief

The R&D investment tax credit, beloved by industry and apparently on the way to renewal by Congress, stimulated only \$1-2.5 billion of additional research spending between 1981 and 1985 at a cost of \$7 billion in lost tax revenues, says a report by the General Accounting Office (GAO/GGD-89-114). GAO adds that 80 percent of the credits went to corporations with assets of \$250 million or more.

Also from GAO: The Department of Energy printed 19,000 copies of the 8000-page Final Environmental Impact Statement for the Superconducting Super Collider and mailed 17,000—total weight 221 tons—to "agencies, organizations, and individuals," at a printing and distribution cost of \$1.4 million. The GAO report (GAO/GGD-89-104) says DOE could have saved \$217,535 by using United Parcel Service instead of first-class priority mail. DOE responded that it hadn't thought of that. GAO also says that a summary would have sufficed for most addressees, but adds that in DOE's view, "ensuring full and unquestioned compliance with the regulations was the overriding factor." Both GAO reports are available without charge from: GAO, PO Box 6015, Gaithersburg, Md. 20877; tel. 202/275-6241.

NIH's Office of Human Genome Research has been upgraded to the National Center for Human Genome Research, reflecting its big-buck status, from \$17 million two years ago to \$100 million proposed for this year. An announcement by Health and Human Services Secretary Louis Sullivan says the Genome Center will take over from the National Institute of General Medical Sciences "total responsibility for all funds earmarked for NIH genome research."

NSF's First Inspector General Setting up Shop

Grantees of the National Science Foundation have provided only an entry or two for the recently expanding annals of scientific misconduct. But whether that's due to clean living or crime undetected may become clearer when NSF's newly established Office of the Inspector General (IG) goes into fullscale operation over the next few months.

NSF got along without an IG for its first 38 years. Its main nod to potential problems came in July 1987, when Director Erich Bloch, viewing the eruption of highly publicized delinquency cases at the National Institutes of Health, issued regulations establishing procedures at NSF for dealing with "Misconduct in Science and Engineering." That would have sufficed as far as the NSF management was concerned, but last year Congress amended the Federal Inspector General Act, mandating IG posts for 33 agencies, most of them small and without any inhouse police service.

The NSF Office officially got going last May with the selection of the Foundation's first IG, Linda G. Sundro, an attorney who previously served at the Department of Commerce as Counsel to the IG and Acting Deputy IG. The new Office took over the 17-member staff, the budget (\$2.6 million), and most of the responsibilities of the NSF Office of Audit and Oversight. The big change is that the IG has authority to initiate and conduct investigations, for which

investigators will be hired, Sundro told SGR. The scope of the office extends to financial and scientific misconduct, violation of conflict-of-interest rules, and other sins.

As part of the process of internal and external checks on NSF operations, the IG staff will spot check records of projects for financial rectitude and compliance with the assortment of regulations that accompany government money. The House-Senate conference report on the bill establishing the new IGs noted, however, that "the conferees do not intend that the IG at the National Science Foundation question the merits of a specific grant or contract proposal..."

The startup at NSF has been slowed by federal hiring regulations, which generally entail a recruitment process of three to six months, but Sundro says appointments are in the works and she expects her office will be fully operational by the end of the year.

The IG operation is housed at NSF headquarters, in downtown Washington, but is organizationally separated from the NSF staff and has no official line of contact with the NSF management. It is administratively attached to the National Science Board, the 24-member policymaking body for the Foundation. Its point of contact there is NSF member James L. Powell, President of Reed College.

Academic R&D

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and colleges was one and one-half times higher than levels reported 10 years earlier."

The federal share reported in these totals dropped from 67 to 61 percent, a change attributed to a rise in funds from industry and from the universities themselves. But NSF notes that "Cost sharing and underrecovery of indirect costs account for nearly one-half of the university contribution towards research activities."

The report also points out that "Despite large relative gains in non-federal support, the majority of spending growth in absolute terms was attributable to increases in federal funding in most disciplines; only in the social and 'other' sciences (i.e., multidisciplinary areas) did more than one half of the R&D increase come from non-federal sources. Academic spending in engineering rose 15 percent over 1986 levels, with federal sources providing over one-half the increased support."

Other items noted in the report: Federal agencies provided three-fifths of academic research equipment expenditures in 1987, compared with two-thirds in 1986; basic-research expenditures in academe totaled \$8.3 billion in 1987, a 7-percent real increase, while applied research and development reached \$3.8 billion, an 11-percent increase; and during 1977-87, state and local governments increased R&D support to universities by 4 percent per year.

The continuing concentration of academic research, and federal funding for it, in a small number of universities was also confirmed by the report, which states that in 1987, 20 universities accounted for 35 percent of all academic research expenditures and 40 percent of the federal research support. R&D expenditures by the top 20 reached \$4.2 billion.

"The 100 largest academic performers," the report continued, "expended \$10 billion, accounting for 83 percent of the R&D total and 84 percent of federally financed expenditures, similar to shares reported during the last decade."

The top 10: Hopkins, MIT, U. of Wisconsin, Cornell, Stanford, U. of Michigan, U. of Minnesota, Texas A&M, UCLA, and U. of Illinois, Urbana.

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... Free Subscriptions Sent to All NIH Grantees

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who put up a large part of the reported \$1.8-million startup kitty.

The *Journal*, which began publication on a bi-monthly schedule with a May-June issue this year, plans to go monthly in March. It is sent free to a circulation list that consists of a golden constituency for sellers of laboratory equipment and services: the 24,000 principal investigators in the extramural programs of NIH and its sister agency, the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA), plus 2400 researchers on the NIH Bethesda, Md., campus and several satellite locations. The names and addresses are easily available, inexpensively priced public information. In addition, there are about 500 paid subscribers at \$39 a year for individuals, \$69 for institutions. (Order from: *Journal of NIH Research*, 2000 Pennsylvania Ave. NW, Suite 3700, Washington, DC 20006; tel. 202/785-5333.)

The *Journal* notes on its index page that it "is not affiliated" with NIH or ADAMHA. But the notice adds that "The *Journal* was created with the cooperation of NIH and ADAMHA to facilitate dissemination and discussion of news and biomedical research findings among scientists whose research is supported by NIH and ADAMHA." The editorial advisory board includes several prominent NIH staff members, among them Anthony S. Fauci, Director of the National Institute of Allergy and Infectious Diseases, and W. French Anderson, of the National Heart, Lung, and Blood Institute.

With advertising rates in publishing keyed to circulation, the new journal's lure for advertisers is its concentration of sales prospects in people bankrolled by NIH and ADAMHA, undiluted by the diversity of readers common to general-circulation publications. Each of three issues published so far has carried about 55 pages of advertising, at a one-time rate of \$2700 per page for black and white and \$3800 for four-color. The comparable cost figures for *Science*, with a circulation of 153,500, are \$4960 and \$6180. Many of those *Science* subscribers are not in the market for expensive scientific equipment.

The three issues have each carried about 100 pages of editorial matter, mainly news of NIH and biomedical developments and reviews and analyses of recently published research papers, along with interviews with their authors. Editor Barnes says there are no plans to become a place of primary publication for research.

Barnes and Miller also discount any intent to compete with *Science* for advertising or readers' attention. Their advertising, they say, has not come at the expense of other publications. That may actually be the case, an ad manager on a major journal tells SGR. Ad volume for scientific instruments has recently picked up a bit after two flat years, he said.

But for the managers of the AAAS, the arrival of a new

journal in the competitive field of instruments advertising is not the happiest event of the season. *Science*, the principal attraction for membership in the AAAS, has been stuck at a circulation of about 155,000-160,000 for over a decade, despite a doubling during that time in the ranks of the American scientific community. Ad revenues at *Science* rose from \$12 million in 1987 to \$13.4 million in 1988. Nonetheless, the AAAS ran a \$194,000 deficit in 1987 on a \$29 million operating budget; last year, the deficit reached \$1.2 million on a \$32.2 million budget. In response, there have been hiring freezes and various other austerity measures. Dues have been raised to \$75 per year, but the lack of membership growth suggests a limit to that revenue-producing tactic.

Meanwhile, *Science*'s British counterpart and competitor for ads, the commercially published weekly *Nature*, though still possessing a far lower circulation, has recently been leaping upwards with 15-20 percent per year gains in subscribers, and is now around 45,000 in circulation. *Nature* is also fat with ads.

The controlled-circulation style of the *Journal of NIH Research* is a well-established technique in specialized publishing, but the focus on the grantees of two closely related federal research agencies appears to be novel. The common response in publishing circles is along the lines of "What a terrific idea." —DSG

Public Sees Fraud in Science

A large majority of the general public believes that "fraud or misrepresentation" are no rarities in the conduct of medical research.

Seventeen percent believe there is "a lot" and 41 percent "a fair amount," the Gallup Organization reports in the latest of its annual opinion polls conducted for the American Medical Association. Another 24 percent opted for "not too much."

The finding, based on telephone interviews with 1500 randomly selected persons over age 18, is open to various interpretations and questions of validity. The question about fraud prevalence was preceded by a cue: "Occasionally a news story is published about a medical researcher who has misrepresented the results of a research project." Nonetheless, the reported response raises the possibility that the public is not swallowing the establishment line of fraud as a minuscule rarity.

When the same question was addressed to 1000 physicians, 4 percent replied that there's "a lot" of fraud, 18 percent "a fair amount," and 48 percent "not too much."

Regarding federal support of biomedical research, 37 percent of the public sample said it should be increased, while 50 percent said it should "stay about the same." Among the doctors surveyed, 51 percent supported an increase while 42 percent preferred "about the same."

NIH Enlarging Panel for Reopened Baltimore Case

The so-called Baltimore case has been quiet since the Nobel-laureate scientist orchestrated a public-relations thrashing in May against his Congressional tormentor, the formidable and rarely bested Rep. John Dingell (D-Mich.) [SGR May 15: "Baltimore Wins PR Battle, But Key Issues Remain"].

But there are stirrings in the case, which arose from charges by a former MIT postdoctoral fellow, Margot O'Toole. She alleged a coverup of errors and fabrication of data by one of Baltimore's co-authors of an important paper in the April 25, 1986, *Cell*, Thereza Imanishi-Kari, now at Tufts University.

Following a long investigation, an outside panel of scientists appointed by NIH cited several flaws in the paper and recommended publication of a correction. Though in large part vindicated by the panel's findings, O'Toole insisted at Dingell's hearing in May that they didn't go far enough. And on the basis of that, the then-Director of NIH, James B. Wyngaarden, ordered a reopening of the investigation.

The investigation, in the hands of NIH's recently established Office of Scientific Integrity (OSI), is proceeding, though very slowly, which is the customary pace in these matters. Brian Kimes, Acting Director of OSI, told SGR last week that the plan is to add "at least two" members to the panel of three that originally investigated the case for NIH—Joseph M. Davie, Searle Pharmaceuticals; Hugh McDevitt, Stanford University, and Ursula Storb, University of Chicago. OSI has been talking to prospective recruits for the panel, he said, but none has yet been signed on.

The purpose of enlarging the panel, Kimes said, "is to add greater objectivity to the group," which he said has been so long steeped in the case that fresh perspectives might be valuable. Kimes added that "the goal is to look at everything carefully," because, he said, NIH wants a final conclusion to the long-running case.

Among the things to be looked at, he said, are findings by the Secret Service, presented at Dingell's hearing, that Imanishi-Kari's laboratory notes supporting the published paper contained altered dates and were written long after she said they were. She has denied that, attributing any seeming discrepancies to untidy notekeeping.

Baltimore and his colleagues used that response, among various other materials, to depict the Dingell inquiry as a benighted assault on scientific freedom. In a nationwide campaign of letters to the editor and op-ed articles, they contended that politics was seeking to deprive science of the valuable right to make mistakes in seeking the truth. The hearings were portrayed by Baltimore and his supporters as a resurgence of McCarthyism focused on science.

What they left out was that O'Toole's criticisms of the published paper—eventually in large part vindicated by the NIH inquiry—had been dismissed by MIT, Tufts, and Bal-

timore and his co-authors. Dingell described that as "circling of wagons" in the face of legitimate criticism. Words of praise for O'Toole in the final report by the NIH panel mysteriously disappeared while the report was in the hands of NIH staff members. And O'Toole, once a respected post-doctoral fellow, has been unable to find a job in her field, immunology. NIH Director James Wyngaarden, a pillar of the science establishment, stated in announcing reopening of the investigation in May, "We are concerned that Dr. O'Toole's scientific career has been damaged simply because she has pursued her convictions."

Meanwhile, Dingell has been busy with the Food and Drug Administration's failings on the safety of generic drugs and imported foods, and has not personally returned to the Baltimore case, which is a small item on his agenda. The case, however, is alive at the staff level, mainly in the care of Walter Stewart, whom Dingell borrowed from NIH to provide his Committee with expertise in the area of scientific misconduct. But stonewalling by the Baltimore camp has been effective in the absence of Chairman Dingell's close involvement.

In July, following a telephone call to Imanishi-Kari's attorney by a member of Dingell's staff, a confirming letter over Dingell's signature was sent to Imanishi-Kari requesting a meeting. The request was for her to meet with staff members of the Subcommittee on Oversight and Investigations (of the Energy and Commerce Committee, both chaired by Dingell), and Secret Service specialists who had studied her notes at Dingell's request. The letter also noted that NIH "has requested that certain of its staff members [from the NIH Office of Scientific Investigations] be able to sit in on this interview."

The response from the attorney, Bruce A. Singal, was that his client had been maligned by Dingell's investigators and would not agree to a meeting until the Subcommittee provided her with "notice of the allegations against her, and all data and documentation supporting such allegations." To that, Singal added, in standard lawyerish gibberish, a long list of items to be provided, among them:

"A full description of any and all pages and any and all notations which it is contended were 'altered,' 'faked,' written after the fact, or otherwise identified by the Secret Service as being out of sequence, changed, or irregular in any respect, and for each an identification of the processes used to arrive at such determination and the reasons for the determination."

The attorney also expressed concerns about "the extensive overlap and cooperation which seems to exist between your Subcommittee's investigation and that of NIH," stating that it "raises the potential of impugning the independence of the NIH review." In a closing note, he stated: "So that she may concentrate on her important scientific pur-

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Federal Economic Data Faulty, OTA Study Says

Oh, how we revere official statistics, those precise, seemingly authoritative numbers that purportedly reflect realities beyond personal knowledge: exports, productivity, price changes, scientific manpower, and so forth. The latest data in these and other areas are widely received as established truths, as reliable as official temperature readings or batting averages. In response, government and industry set policies and plans and, of course, the stock market gyrates.

Not often examined, however, is whether the numbers even approximate reality. When that's done, they are often found to be so plainly inaccurate or statistically bizarre that their acceptance suggests a gullibility epidemic or a national hunger for assurance that what's going on out there is measurable, if not understandable. The reality, however, is that we seem to know less and less about the economy as industry goes international and new high-tech products and services upset traditional statistical scorekeeping.

Nonetheless, the trade deficit, along with the budget deficit, provides powerful ammunition for the budget crimping that has derailed many aspirations, including those in science. For example, the repeated budget disappointments of the National Science Foundation have regularly been justified in Congress on the grounds of affordability. The realities of the American economy may be better, or actually worse, than indicated by the official and influential statistical portraits. The one safe conclusion, however, is that because of the vagaries of the numbers gathering, no one knows.

A new study by the Congressional Office of Technology Assessment, *Statistical Needs for a Changing US Economy* (see In Print, P. 8), notes the haphazard nature of crucial import-export data. A review of US-Canadian trade figures for 1986, OTA says, resulted in a 42 percent downward revision of the US trade deficit, from \$23 billion to \$13 billion. The explanation, quoted from a study by the General Accounting Office, is that "there is a strong possibility that US exports are not fully counted; as a result, the US merchandise trade deficit possibly has been overstated for the past several years."

A basic problem, OTA says, is that the record-keeping of international trade has failed to keep up with the new patterns of international production. "In 1985," OTA reports, "nearly a third of all US exports were exports from US companies to overseas affiliates. Over a fifth of all imports to the United States came from these affiliates." However, data on what's produced where is skimpy, OTA states, with the result that an "uncomfortable number of assumptions must be made to see which industries are affected directly and indirectly by changes in the US trade position."

The low level of increase in American productivity is a persistent theme in economic policymaking, but here, too, reliable information turns out to be scarce. OTA cites a study that concluded that "as much as 30 percent of the productivity decline after 1973 is the result of errors in measuring both outputs and inputs." The OTA report says that

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Baltimore Case

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suits, I am requesting that all communications with Dr. Imanishi-Kari be through me as her attorney."

SGR is advised that there have been no further communications. Basically, the case is on hold at Dingell's Subcommittee until the Chairman has time to take it up again.

On one other front there's been activity arising from the Baltimore case: a letter to *Science* of September 15 by Herman N. Eisen, of the MIT Center for Cancer Research, who headed the training-grant program in which O'Toole was enrolled at MIT. Eisen had investigated her critical analysis of the *Cell* paper in 1986, and concluded that her reservations warranted no action. Referring in the *Science* letter to a memo she wrote to him at the time, Eisen stated that "Although in the beginning O'Toole focused entirely on disagreements with the authors' interpretations of what she regarded as weaknesses in their data, she has recently adopted the position that there were no data at all to support some of the published results, for example, that certain hybridomas had been 'subcloned.' "

But an examination of O'Toole's 1986 memo to Eisen

shows that she did indeed raise the issue of whether the data reported in the *Cell* paper actually existed. The memo states that "the statement on page 250 [in *Cell*] that the majority of these hybridomas express gamma-2b is based on an analysis of hybridomas from another fusion."

O'Toole's point was confirmed by the NIH investigating panel, which stated in its report: "There is an additional inaccuracy in the text referring to Table 2. On page 250, it is stated that the 'remaining 119 clones produced other Ig heavy chain isotopes, the majority being gamma-2b (data not shown).' This statement is inaccurate," the panel reported, adding that "isotoping was not done, but was claimed to have been done."

SGR telephoned Eisen to ask whether he stood by his claim in the *Science* letter. He responded, "I feel the letter is accurate."

Finally, the longrunning case is the subject of an article assigned by the *New York Times Magazine* to a free-lance writer, Philip Weiss, who has spent several months on the task. The article, publication schedule unknown to SGR, could be influential in shaping public opinion on a subject whose basic complexities have been compounded by partisan representations.—DSG

The Stymied Search for a Director for the NIH

Public silence prevails at search-central since several candidates said "no thanks" to the possibility of becoming Director of the National Institutes of Health.

Two lists of five were forwarded to Health and Human Services Secretary Louis Sullivan by the search committee. The top choice was Anthony Fauci, Director of NIH's National Institute of Allergy and Infectious Diseases and also chief of the NIH AIDS program. Fauci declined, saying he felt most useful in his present combination of jobs, which include time in the lab, rare for a senior NIH administrator.

Also on the list: William Danforth, Chancellor, Washington University; P. Roy Vagelos, President, Merck and Co.; Leon Rosenberg, Dean, Yale School of Medicine, and Philip Leder, Chairman, Genetics Department, Harvard Medical School. The second list has not been approached and the search committee has not been reconsulted. Fears of drift without a Director for NIH are prevalent but unfounded. The post is remarkably free of power and authority, as was noted by former Director Donald Fredrickson, who likened it to "being President of Switzerland."

Statistics

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productivity figures compiled by the Bureau of Labor Statistics are especially poor in coverage of the service industries, which now account for a majority of employment. The unreliability of many basic official statistics even extends to the number of scientists and engineers in the US, a seemingly simple matter that merits accuracy, given the many hair-raising reports about impending massive shortages. The subject of these uncertain numbers was critically addressed last spring in a report by the National Academy of Sciences, *Surveying the Nation's Scientists and Engineers: A Data System for the 1990s* (SGR, April 15: "R&D Manpower Data Badly Flawed, Study Says").

The Academy study found that while NSF puts the number of scientists and engineers in the US at 4,626,500, the Bureau of Labor Statistics, using census information and its own criteria, states the count at 3,287,000. NSF says there are 411,800 "biological and life scientists." The Bureau of Labor Statistics could find only 65,000.

Asked to account for these wildly varying figures, the authors of the Academy report concluded that "they are not readily explained," and confessed, "We are greatly troubled by these differences."

Many federal statistical programs were gutted in the early years of the Reagan Administration and began to make a comeback only after industry felt the loss of the missing data. The recovery still has a way to go. And the OTA report also lays a good deal of blame on the Office of Management and Budget, which is supposed to supervise the government's far-flung statistics gathering. OTA says that OMB doesn't seem to take the task seriously.

To the Editor: Priorities at Hughes Institute Defended

Informed criticism is always useful to an institution. In that spirit, we want to be certain that we understand SGR's September 15 article about the Howard Hughes Medical Institute (HHMI). Here is our reading of your most important points [followed in each instance by the relevant quote from SGR]:

(1) The HHMI is meeting its expenditure obligations as a Medical Research Organization under the US tax laws ("Whew! Hughes Institute Fulfills Spending Quota").

(2) The investigators appointed by HHMI are outstanding scientists ("a nationwide elite").

(3) Providing research support to its own scientists and grants for science education are the Institute's most important missions ("top priority is accorded to getting money out the door").

(4) The Institute's endowment has increased through prudent investment ("HHMI's assets, now swollen to \$6.5 billion").

(5) Institute investigators would do well in the competition for NIH grants ("would excel in the NIH funding derby").

(6) The support scientists receive from the Institute is considered to be highly desirable ("comes with few strings or hassles. . . In the world of research, it is perhaps the sweetest money available.")

To be truthful, I believe that your tongue missed your cheek and hit a bile duct. But we are grateful for a chance to get our views on the record.

Robert A. Potter
Director of Communications
HHMI
Bethesda, Md.

(Ed. Note: Beyond the swarms of biomedical mendicants surrounding the Hughes money mountain, an important, neglected point merits the attention SGR sought to rouse. Because of the eccentricity of its founder, and the fecklessness of IRS policy, HHMI is at liberty to spend freely in the only area of non-military research generously financed by the federal government—medical research, on which NIH will spend \$7.5 billion this year.

The \$231 million that Hughes spent last year exceeded the R&D budget of the Environmental Protection Agency (\$202.5 million) and the science-education budget of the National Science Foundation (\$190 million). How's that for sensible use of resources to meet the country's many neglected needs?

... More In Print: Risks, Computer Policy, Traffic

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nology Policy to draw up an interagency masterplan for dealing with global change, this season's trendy item in science-policy affairs, the Committee recommends a \$57-million budget increase in this area, for a total of \$191 million in fiscal FY 1990. The report has been endorsed by the Bush Administration and is reflected in its 1990 budget.

Order from: Books and Open Files, Branch of Distribution, USGS, Box 25425, Federal Center, Denver, Colo., 80225; tel. 303/236-7476.

Improving Risk Communication (334 pp., hardbound, \$39.95; paperbound, \$29.95), by the National Academy of Sciences Committee on Risk Perception and Communication, chaired by John F. Ahearne, Executive Director, Sigma Xi (a national scientific society), comes out strongly for truthfulness, clarity, respect for the public, etc. when experts discuss risk with the general public. There are a few useful nuggets in this slagheap of techno-babble, but they're obscured by revelatory gems such as: "People differ. Their interests, life-styles, and living conditions vary." And, "In a democracy, communication is an essential part of all societal decisions."

Order from: National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 202/334-3313.

The Federal High-Performance Computing Program (53 pp., plus appendix, no charge), report and recommendations, prepared by a federal interagency task force orchestrated by the White House Science Office, calls for acceleration of government programs in high-speed computing, hardware, software and national-network development, etc. Over five years, spending would rise from the current \$500 to about \$1 billion. The goals are basically in harmony with Sen. Albert Gore's National High-Performance Computer Technology Act (S. 1067), but a covering letter from White House Science Adviser D. Allan Bromley cautions that the report is intended for agency-level planning and does not represent a commitment by the Bush Administration. That means the agencies involved are still fighting the Office of Management and Budget for the needed money.

Order from: DARPA, ISTO, 1400 Rosslyn Blvd., Arlington, Va. 22209-2308; attn. Steve Larson; tel. 202/694-5800.

Advanced Vehicle/Highway Systems (AVHS) and Urban Traffic Problems (26 pp., no charge), staff paper, first publication from the Congressional Office of Technology Assessment's major study of national infrastructure, a topic of rising political concern. The report, requested by the Transportation Subcommittee of the Senate Appropriations Committee, sees traffic-moving potential in AVHS, which include automatic vehicle identification and billing, collision-avoidance devices, automatic vehicle control, etc. With technologies now available, OTA says, traffic increases of

10 to 20 percent are possible, along with improved safety and emission reduction. Washington should provide money and leadership to encourage state and local governments to adopt the systems, OTA suggests.

Order from: US Congress, Office of Technology Assessment, Press Office, Washington, DC 20510-8025; tel. 202/228-6204.

Impact of Science on Society, quarterly journal of the United Nations Educational, Scientific and Cultural Organization (\$52 per year, about 100 pp. per issue). The latest issue, No. 153, on the theme "Ageing and the Evolution of Old Age," includes articles by Leonard Hayflick, UC San Francisco Medical School; M.S. John Pathy, University of Wales College of Medicine; R. D. Cape, Australian National Research Institute of Gerontology and Geriatric Medicine; Robert Hugonot, University of Science and Medicine, Grenoble, and Anatolii Talchuk, A. Gorky Pedagogical Institute, Minsk.

Order from: Taylor & Francis Inc., 1900 Frost Rd. Suite 101, Bristol, Pa. 19007; tel. 215/785-5800, ext. 112. Also available abroad from Taylor & Francis and other publishing outlets.

Job Changes & Appointments

Roger Lewin, Deputy News Editor of *Science* and editor of its Research News section for most of his nine years there, has resigned to co-author a book with Richard Leakey and to pursue other writing projects.

Also at *Science*, **Jeremy Cherfas**, a British science writer and television producer, has been appointed European Correspondent, succeeding **David Dickson**, who has joined the staff of the British weekly *New Scientist*.

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Statistical Needs for a Changing US Economy (GPO Stock No. 052-003-01162-0; 40 pp., \$2.50), by the Congressional Office of Technology Assessment (OTA), adds to widespread complaints about the quality and timeliness of US government economics statistics, on which \$1.5 billion a year is spent, not counting the decennial census. The report, requested by the Senate Committee on Governmental Affairs, notes that the Office of Management and Budget (OMB) is the designated ringmaster for the many federal agencies collecting and analyzing statistics, but "OMB has not given it much priority and has dedicated few resources to the effort." Ranked as a "background paper"—a relatively minor production in the OTA hierarchy of publications—the report is "an extension" of a heavyweight work issued in May 1988, *Technology and the American Transition* (GPO Stock No. 052-003-01096-8; 504 pp., \$20).

Also from OTA: *Polar Prospects: A Minerals Treaty for Antarctica* (GPO Stock No. 052-003-01161-1; 218 pp., \$10), says ratification of the Antarctic Minerals Convention, a proposed offshoot of the 1959 Antarctic Treaty, would safeguard US interests in environmental protection and scientific research in the region, as well as retaining the option for eventually exploiting mineral resources there. The report, requested by four Congressional committees, was prepared under an advisory panel chaired by Robert H. Rutherford, President, University of Texas, Dallas.

Order the above OTA publications from: USGPO, Superintendent of Documents, Washington, DC 20402; tel. 202/783-3238.

Understanding Superfund: A Progress Report (RAND/R-3838-ICJ, 65 pp., \$7.50), from the RAND Corporation Institute for Civil Justice, by Jan Paul Acton, says the Environmental Protection Agency spent only 57 percent of its \$4.5 billion Superfund appropriation during 1980-88, and that only 34 of nearly 1200 foul sites have been declared

clean. Of the \$2.6 billion, only \$1.6 billion was spent on "site-specific activities," with the balance going to "administrative, laboratory, management, and litigation costs." The report also states that EPA has recovered only 10 percent of its cleanup expenditures, despite a Congressional mandate for polluters to pay the costs.

Order from: RAND, Publications Dept., 1700 Main St., PO Box 2138, Santa Monica, Calif. 90406-2138; tel. 213/393-0411.

Assessment of the National Science Foundation's Engineering Research Centers Program (20 pp., no charge, supply limited), report by a National Academy of Engineering committee, chaired by William P. Slichter, retired AT&T research executive. Requested by NSF, the report lauds the ERCs, of which there are now 18, saying they are establishing new academic-industrial ties and engaging in new lines of research valuable for industry. It notes, however, that NSF funding is short of original expectations and that "there are at least some indications that NSF is becoming somewhat overzealous in pressuring ERCs to seek industry funding," which covered 31 percent of total ERC costs in Fiscal 1988. ERC skeptics, abundant among academic traditionalists and anxious solo researchers, will find confirmation of their fears in one passage: "As one engineering dean put it," the report states, "the ERC has changed his university; it has had a profound effect on the entire institution and the nature of interactions among faculty and students." All that for \$3 million a year from a government agency!

Order from: National Academy of Engineering, Program Office, NAS 309, Washington, DC 20418; tel. 202/334-1650.

Our Changing Planet: The FY 1990 Research Plan—The US Global Change Research Program (118 pp., plus appendixes, no charge), full report (following issuance of a summary in April) of the Committee on Earth Sciences, chaired by Dallas L. Peck, Director, US Geological Survey. Convened by the White House Office of Science and Tech-

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